



INSTITUTE FOR DEFENSE ANALYSES

## **Acquisition Initiatives—Phase II**

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## **PREFACE**

This document reports the work performed by the Institute for Defense Analyses for the Director, Acquisition Resources and Analysis, Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics) in fulfillment of the task entitled “Acquisition Reform Review.”

The authors wish to thank the reviewer, Mr. David McNicol.

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## EXECUTIVE SUMMARY

The Institute for Defense Analyses (IDA), assisted by the CNA Corporation, was tasked by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD(AT&L)] to examine recent acquisition reform initiatives and to make appropriate recommendations for further efforts by the Undersecretary of Defense for Acquisition, Technology, and Logistics [USD(AT&L)]. Our review focused on the processes and procedures for the long-term acquisition of military equipment and systems essential for properly equipping and supporting the future military force structure. This report excludes (1) ongoing initiatives to improve the procedures for rapidly responding to emerging needs of current operations, particularly in Iraq, and (2) a broad treatment of excessive acquisition cost growth—an important topic that is the subject of a separate ongoing IDA study.

In this Phase II report the team proposes three major sets of initiatives (discussed in the next three sections) and one minor initiative (discussed last) for further action by the USD(AT&L).

### I. IMPROVED PROGRAM STABILITY AND “JOINTNESS” THROUGH BETTER INTEGRATION OF REQUIREMENTS/PROGRAMMING/ACQUISITION PROCESSES

Most of the Phase I Report initiatives recommended for further consideration can be characterized as “good ideas that were never fully implemented.” Chief among them is the Packard Commission recommendation for better integrating the Defense Department’s acquisition, requirements, and program/budget processes, with a particular emphasis on clarifying and strengthening the role of the Secretary’s office in deciding *what* to buy (the requirements process), not just *how* to buy it. This is particularly important for programs that are essential to effective and efficient joint military operations, such as command and control systems. Closely related is the need for the acquisition executives to work within the resource allocation process to improve acquisition program funding stability. A specific improvement would be to push for more accurate programming and budgeting for the **major non-acquisition** elements of the DoD program—mainly military personnel and operations/maintenance costs. This broad

initiative encompasses requirements formulation, acquisition management, and joint programming, as detailed below.

### **A. Requirements Formulation**

Under the law (though never strongly invoked), the USD(AT&L) already is responsible for “requirements” because he is empowered to decide what weapons systems (including key characteristics) DoD will propose to buy.<sup>1</sup> The Joint Staff’s Joint Requirement Oversight Council/Joint Capabilities Integration and Development System (JROC/JCIDS) process provides the fiscally unconstrained requirements **advice** of the warfighters, but not the requirements **decision**. Such advice is routinely provided not only by the Chairman of the Joint Chiefs of Staff, but also by the Service Chiefs and, increasingly, by the Combatant Commanders. As a practical matter, the Service Chiefs are the primary source of proposals for new weapons systems and decisions to change them.

The key vehicle for integrating perceived needs for new weapon system development into the larger DoD resource management process is the OSD-managed broad Analysis of Alternatives (AoA). Current directives call for an AoA prior to the convening of the Milestone A review by the Defense Acquisition Board (DAB) that sets the stage for a potential new acquisition.<sup>2</sup> In recent years, however, early AoAs have been neglected, in part perhaps because directives have defined formal acquisition program initiation to occur at Milestone B. Experience has shown that if the Defense Acquisition Executive’s (DAE) attention to potential large new acquisition programs is delayed until Milestone B, it can be inordinately difficult for him to rectify earlier missteps.

#### *Recommendation:*

The Under Secretary of Defense (AT&L) should lead or co-lead a formal AoA that (1) identifies and evaluates a broad range of potential solutions to a perceived need for new military capabilities involving new weapons systems, and (2) occurs well before a Milestone A commitment is made to pursue any particular set of material solutions.

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<sup>1</sup> In this document “requirements” refers to the realistic, achievable, and affordable statements of the intended principal characteristics of a notional new weapon system.

<sup>2</sup> DoDI 5000.2, May 12 2003.

## **B. Acquisition Management**

The Department's procedures for the detailed planning and management of acquisition programs, when followed, *and when accompanied by stable funding*, have generally produced good results. Any significant change to the planned funding profile—almost always a reduction—is usually disruptive to even the best-planned and most technically stable program. The resulting program stretches usually increase total program cost. Nevertheless, such “routine” funding instability is **not** a major contributor to the excessive cost growth of the minority of DoD acquisition programs that contribute to the large majority of the Department's reported total acquisition cost growth.

This report identifies five funding stability issues for consideration. Of those, only the following two are deemed worthy of a near-term USD(AT&L) initiative. The other three issues (“fencing” funds—not worthwhile; provisions for unplanned programs and milestone budgeting—both excessively difficult) are discussed in the body of the report

### **1. Funding Stability Initiative 1: Mitigation of the Migration of Planned Acquisition Funds to the Operating Accounts**

The mismatch between the Department's ability to carefully forecast the funds needed in the future for each approved weapon system and the Department's ability (or willingness) to forecast its needs for future operating funds is an important contributor to the instability of acquisition program funding. Every year the Department is faced with the need to cut back on previously planned and approved acquisition spending in order to meet unplanned needs for operating and maintenance (O&M) funds and military personnel (MILPERS) costs.<sup>3</sup>

This source of instability in acquisition program funding is chronic—not just associated with the current high tempo of unplanned operations. Indeed, a former Deputy Secretary of Defense recently characterized DoD's long-standing budgeting practices for O&M and MILPERS as knowingly “dishonest.”<sup>4</sup>

A broad solution to this problem would be for the Department to plan its long-term O&M spending to the same “most likely cost” criteria that it tries to apply to the

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<sup>3</sup> See the testimony of former Deputy Secretary of Defense John Hamre to the Airland Subcommittee of the Senate Armed Services Committee on 15 November 2005.

<sup>4</sup> Ibid.

planned cost of its weapons systems. The Team believes that real progress will occur in this area only if the Secretary himself demands it.

*Recommendation:*

Although the DAE has little formal leverage over the budgeting of operating, maintenance, and military personnel funds, the USD(AT&L) should enlist the Secretary's support in effecting the needed improvement. The misperception that most acquisition cost growth results from poor acquisition management reflects badly on overall Departmental oversight.

## **2. Funding Stability Initiative 2: The Need for Planned "Reserves"**

The lack of DoD "Management Reserves" is a known source of program instability. Managers of complex civil projects know that they cannot accurately predict the total cost just by adding up the costs of each of the initially planned steps known to be needed. In an analogous situation, builders promise a result at a fixed price but always include some unallocated contingency reserves in their bids based on their professional experience, or they would soon be bankrupt.

In sharp contrast to private sector practice, the major segment of the DoD acquisition spending that is devoted to Research, Development, Test and Evaluation (RDT&E), and most of the remainder that goes to procurement spending, is contracted not on a fixed-price basis, but using cost-type contracts. In principle, the Department could—and should—include prudent contingency reserves in the estimates of both development and procurement costs. In practice, however, there is a bias against such prudent planning, in large part because there is always some need that is more tangible than the unknowns that motivate planning for reserves.

In past years the Department has tried several different approaches to establishing prudent levels of reserves. In all cases, such schemes have been abandoned after only a few years, or even months, because of the difficulty in holding back funds—even outyear funds—against unknown eventualities. The Team's sense is that the stability of acquisition programs is important enough to warrant yet another try at establishing such a reserves program—not necessarily for the budget year, but surely for the outyear plan. Independent cost estimates, important as they are, are not intended to substitute for careful "bottom-up" cost estimates by government program management officials.

*Recommendation:*

The USD(AT&L) should take steps to require that a prudent level of acquisition program management reserves be included in the outyears of the 08-13 FYDP, when completed in early 2007. The extent to which such reserves should be held at the Program Executive Officer (PEO), Service Acquisition Executive (SAE,) or Defense Acquisition Executive (DAE) level should be assessed as a matter of priority.

**C. Joint Acquisition Programming**

While this report echoes many of the themes of the Packard commission, the need for much more “jointness,” or collaborative acquisition among the Services, in the establishment and execution of DoD acquisition programs is largely a post-Packard realization. Under many conditions, better joint acquisition can result in improved battlefield effectiveness and reduced fratricide through better interoperability as well as cost reduction through economies of scale. The major impediments to jointness in the Department of Defense acquisition program planning are well known: (1) the lack of joint operating concepts and (2) the lack of joint funding mechanisms. These impediments to achieving the long-standing goal of having acquisition programs “born joint” are discussed below.

**1. Joint Operating Concepts**

A common, unified concept of how the services intend to operate together is essential to real joint acquisition. The Marines pride themselves on having established effective operational concepts for air-ground operations across a broad range of combat scenarios. The unity of such concepts is widely advertised as integral to their Marine Air-Ground Task Force (“MAGTF”) organizational structures. Joint operating concepts and joint integrating concepts that cross the boundaries of the other Services, however, are much less well developed. The Joint Staff is working to develop a broad range of joint operating and integrating concepts to address this need, but progress is glacial.

Research at IDA into the differences between the originally joint F-111 program that reverted to a single-Service program, and the largely successful (to date) joint F-35 program, identified one overriding factor. In the F-111 program the Navy and Air Force failed to agree on an acceptable set of joint performance requirements, largely because of differing operating concepts. In contrast, agreement was reached early

between the Services on F-35 performance requirements, thereby permitting considerable commonality.

The lack of planned interoperability among the military services is not a new problem. In discussing the acquisition of equipment important to the interoperability of US forces, the 2004 CSIS report *Beyond Goldwater-Nichols* (BG-N) stated:

This enduring lack of jointness in how DoD procures weapons has both raised the cost of military operations (e.g., persistent interoperability problems cause friendly fire casualties) and constrained the growth of US military capabilities (e.g., Services invest too much in duplicative capabilities and too little in Low Density/High Demand assets).

Nowhere is the need for improved coherence in the acquisition of military capabilities more apparent than in command, control, and communications (C3) systems. Although the Under Secretary for Acquisition, Technology and Logistics has both the responsibility and authority to decide what the Department will propose to buy, he is not chartered or staffed to establish the joint operating concepts that are particularly important to the acquisition of C3 systems.

Joint acquisition opportunities too often become apparent only very late in the process of establishing new service-unique acquisition programs. A recent example involved the DAE exercising his authority by delaying an Army plan to issue an RFP for a new tactical airlifter in order to provide time to establish a joint Army/Air Force program for acquiring a common aircraft.

Secretary Krieg has reportedly moved to take a greater role in the examination of requirements. This is true not only for major defense acquisition programs (MDAPs), but also for programs that may not meet the MDAP cost thresholds but are vital enablers to future joint military operations, such as command and control systems. This latter consideration reinforces the Team's belief that a greater degree of unity could be achieved in DoD's acquisition management practices if the command and control-related acquisition programs now structured and overseen by the Assistant Secretary of Defense (Network and Information Integration) [ASD (NII)], the Commander, Joint Forces Command, and the Joint Staff (J-6), were more clearly brought within the purview and processes of the USD(AT&L).

Similarly, the Team notes the lack of a management mechanism for examining the prospects for "joint" Special Acquisition Programs (SAPs). At present it appears that the Services each establish and manage their own SAPs, and control access thereto, in

ways that largely preclude consideration of joint applications. As with acquisition programs now overseen by NII, the Department's Special Access Programs would likely benefit from greater oversight by the USD(AT&L), with early attention given to potential joint applications.

*Recommendation:*

In support of the previous recommendation that the USD(AT&L) exert stronger leadership in structuring and conducting the broad AoA that should precede any Milestone A review of a potential MDAP or important joint enabling program, the USD(AT&L) should change existing procedures such that all C3 and SAP programs that are potentially important to future joint capabilities are subjected to his early review. To this end he should also consider reorganizing the OUSD(AT&L) staff such that a new element is dedicated to detecting and analyzing potential cross-Service, or cross-mission joint applications of nascent Service development programs regardless of size or stage of formalization. This could build on the recently instituted OUSD(AT&L) Capability Area Review process.

## **2. Joint Funding**

A single flow path for funding for a joint program clearly helps. "Purple" or "joint" funding of common support activities has largely proven its worth. Such DoD-wide activities as the Defense Logistics Agency, Defense Information Services Agency, Defense Finance and Accounting Service, and the Defense Contract Management Agency are widely agreed to now be working well and are considerably less costly than they would have been had the Services each retained such functions. More such "joint" funding appears to be a necessary condition for achieving real progress towards joint acquisition.

There are no examples of single sources of joint funding for successful major cross-Service weapons acquisition programs that have been fielded. The Missile Defense Agency has been a single source of funding only for the development of ballistic missile defenses, not their production, fielding, and support.

It may take another Herculean effort, such as that that went into the Goldwater-Nichols Act itself, to move the Department into a bold new approach to acquiring capabilities that are truly "born joint." It seems unrealistic to expect much more progress toward improved joint acquisition without a major effort by both the Secretary of Defense and the Congress. In the meantime, the USD(AT&L) could take the lead in

establishing a joint funding and management chain for C3 programs important to future joint operations.

*Recommendation:*

The USD(AT&L) should take the lead in establishing a new joint C3 acquisition management office that pulls together the current disparate Departmental initiatives in this area. The resulting structure would be centrally funded and managed in support of the joint operational commanders.

## **II. IMPROVED OUTCOMES THROUGH BETTER SYSTEMS MANAGEMENT PRACTICES**

A major thread of the Packard Commission’s recommendations was to “fly before buy.” Although the importance of this systems management concept is embedded in DoD policies, these policies have been insufficiently heeded in recent years.

Nonetheless, the Department has relied heavily on three key tools that are intended to implement this principle: One is working well (operational testing); the other two—systems engineering and technology readiness assessments (TRA)—are not. Each is discussed below:

### **A. Formal Operational Testing**

Significant benefits have accrued to our warfighters by independently ensuring that their equipment has demonstrated both operational effectiveness and suitability in the field. US military equipment is the envy of the world’s fighting forces, in large part as a result of this rigorous and independent testing.

One complaint about the current operational testing process is that the testing community is too often seen as testing systems against obsolete “requirements.” In this regard, as the USD increases his involvement in overseeing the requirements, one productive avenue of activity would be to strengthen the process that is intended to ensure that the formal requirements documents and associated “test plans” are kept current. Although this measure is important, the Team does not believe it warrants a major DAE initiative.

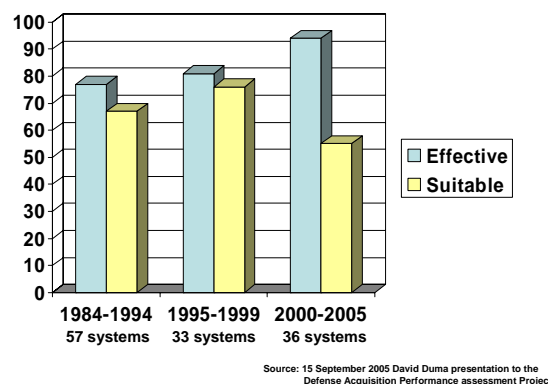


## B. Adequate Systems Engineering in Programs

Good systems engineering is critical to the successful development and production of complex weapons systems. Cost-performance trades are now being made too late and immature technology is being relied upon too often. As a result, rework ensues, schedules slip, and cost grows.

The general problem is illustrated in a recent Government Accountability Office (GAO) report that found that at their point of critical design review (CDR) less than half of DoD's major development programs demonstrated adequate design stability, and that the cost of the programs evidencing such unstable designs grew about **eight times** more than did the cost of the programs with stable designs.<sup>5</sup>

The consequences of such weak systems engineering involve not only short-term cost growth and schedule slips, but also increased operating and support costs after weapons systems are fielded. In recent years there has been a substantial drop in the percentage of systems passing formal operational suitability testing, while at the same time nominal combat effectiveness passing rates have increased. These trends are shown in Figure ES-1.<sup>6</sup>



**Figure ES-1. Percentage of Systems Passing Operational Test**

Declining suitability numbers and their divergence from the effectiveness scores clearly demonstrate a shift in emphasis within both the government and contractor

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<sup>5</sup> Defense Acquisitions: Assessments of Selected Major Weapon Programs, GAO-05-301, March 2005.

<sup>6</sup> There has been a trend of more systems passing operational test from an effectiveness perspective. This trend is primarily the result of a change in testing philosophy. Early on, tests were mostly conducted on a pass-fail basis against a specific (and sometimes outdated or arbitrary) number. In today's environment, testing is more often based on the ability to accomplish the mission.

program offices away from achieving suitability goals that are highly dependent on sound systems engineering practices. The drop in suitability shown in Figure ES-1 can also be attributed to a decline in systems engineering expertise in program offices based on an overreaction to earlier “acquisition reform” initiatives. A number of parallel industry and DoD studies have been conducted to identify the specific systems engineering concerns that need to be addressed. They all identified broad systems engineering weaknesses in the government’s program offices as a major problem.

In confirmation of the foregoing observations, a recent NDIA survey asked industry members the question, “*How would you rate the quality and/or effectiveness of the [government] customer’s program manager systems engineering capability?*” The synthesized answer was: “*Presently, even within a given Service, this varies significantly from program to program. There is a decided lack of systems engineering capability and understanding **compared with pre-acquisition reform days.***” (*emphasis added*)

The Team believes that the observed deterioration in DoD systems engineering discipline is an unintended consequence of two key tenets of the Acquisition Reform efforts of the 1990s: (1) increased reliance on the defense industry itself to oversee complex acquisition programs, and (2) reduced government oversight activities that industry believed led to increased cost and schedule slippages.

As part of the attempt to reduce oversight practices that industry found intrusive, many new development contracts eschewed the traditional requirements for some types of formal reliability and supportability pre-production testing. The resulting lack of contractual requirements for testable “suitability” measures appears to have contributed directly to the deterioration of “suitability” in operational testing as shown in Figure ES-1.

If all of the systems engineering management conditions for a successful program were to be met before formal program initiation at Milestone B, program managers would be in a much better position to maintain cost and schedule. This contrasts sharply with the current situation in which systems engineering plans are hastily drafted just prior to Milestone B, are frequently found to be inadequate, and do not inform or in some cases even reflect the important multi-year risk reduction efforts that should have been started at Milestone A in order to achieve acceptable levels of technical risk by Milestone B. Under current practice, real oversight of MDAPs by the USD(AT&L) doesn't currently begin until Milestone B is imminent.

### *Recommendations:*

The Team recommends three actions that will strengthen the Department's systems engineering management practices.

First, in conjunction with the revitalized Analysis of Alternatives process recommended in Section 1, the USD(AT&L) should reinstitute Milestone Decision Authority oversight of the Milestone A process so that a sound systems engineering management plan is put in place for each alternative that will be pursued into a formal risk reduction/demonstration/validation phase leading to a possible Milestone B formal initiation of a major new acquisition program (or joint enabling C3 or SAP program).

Second, there should be a very high bar for waivers of an inadequate systems engineering plan at formal program initiation at Milestone B. OSD scrutiny of programs should be much more independent and thorough for the events leading up to program initiation. Specifics from each program's systems engineering plan should be incorporated into the Annual Operating Plan.

Third, industry should be better incentivized to meet suitability goals. Most importantly, appropriate suitability demonstrations should be made co-equal with other key systems performance requirements in the prime contracts.

The net result of these three recommendations would be an overall reduction in OSD oversight and a shift of staff effort from trying to help salvage troubled programs to better planning and executing programs in their early stages (including joint programs).

### **C. Technical Readiness Assessments**

Unambiguous DoD policy and guidance requires that certain levels of technology maturity be demonstrated before formal acquisition program initiation at Milestone B. It is widely acknowledged that this guidance is too often being waived. Programs continue to suffer cost and schedule growth as a result of proceeding into system development before key technologies are sufficiently mature. The Army's FCS program is a well-known specific example.

Acquisition executives frequently waive these clear requirements because, for one thing, under current DoD oversight practices, the specific technical risks faced by emerging programs have very little visibility prior to being considered at the point of formal program initiation—Milestone B. At that point program schedules and outyear funding have been established in such a way that Milestone B disapproval because of

technical immaturity would seriously disrupt the Service's plans, including the award of the SDD contract. A more formal requirement for early identification and review of technical risks starting at Milestone A would significantly ameliorate this problem.

The GAO has estimated the effect of such departures from policy in an analysis of 54 major programs.<sup>7</sup> According to the GAO, only 15% of these programs began full systems development with mature technology. Those that did suffered less than one-fourth the cost growth of the immature programs.

In addition to the late involvement of the Milestone Decision Authority, the ability of DoD to competently identify critical technologies, program funds to reduce their risk, and then assess their maturity at Milestone B is hobbled by the lack of *independent* technical expertise within the government.

*Recommendation:*

In support of the increased USD(AT&L) responsibility for early program definition, require that the formal, independent, identification of key technical risks be made at or shortly after Milestone A, with specific funded plans to be put in place to achieve their specified level of technical maturity by Milestone B, as determined by independent assessors.

### **III. BETTER ACCOUNTABILITY IN THE ACQUISITION WORKFORCE**

In its simplest terms, the Packard Commission recommended that DoD implement an industry model with six attributes. A general assessment of the lack of full implementation of those recommendations was included as Appendix B in our Phase I Report, IDA Document D-3189. The following two attributes appear to the Team to warrant near-term Under Secretary attention to help improve accountability in the Department's acquisition process.<sup>8</sup>

#### **A. Clear Command Channels**

The Packard commission sought to achieve clear command channels by limiting intervening layers between the program manager (PM) and the Acquisition decision

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<sup>7</sup> Defense Acquisitions: Assessments of Selected Major Weapon Programs, GAO-05-301, March 2005.

<sup>8</sup> Accountability is the "Liability to give account of, and answer for, discharge of duties or conduct; responsibility." (Oxford Dictionary)

maker (Defense or Service Acquisition Executive—DAE or SAE) to no more than two. In Packard’s view, the shortened decision-making chain would alter the nature of oversight in a way that would reduce the number of staff overseers and speed up decision making.

While DoD policy documents say the Department has implemented Packard, one has simply to overlay a graphic of the proposed Packard chain of command with the Integrated Product Team (IPT) structure currently *mandated* by DoDI 5000.2 to see the problem. Clearly short lines of communication have not been established, and this failure is a matter of official policy. The Overarching IPT (OIPT) is widely seen as a particular impediment to the rapid and effective decision making envisioned by Packard. By increasing the accountability of the subordinate acquisition executives, the need for this extra layer of virtual management could be reduced or eliminated. The Team’s recommendation for dealing with this aspect of the accountability problem is reflected in the subsequent paragraphs. This assessment is not meant to include the cost estimating and testing IPTs, which are working relatively well and are grounded in law as well as in DoD Instructions.

## **B. Clear Responsibility and Consequences for Actions**

Packard stated, “[A]uthority for executing acquisition programs—and accountability for their results—has become vastly diluted.”

We conclude that not only has this problem not been fixed in the 19 years since Packard, it may have gotten worse in some ways despite implementation of Packard’s recommendation to establish a Defense Acquisition Executive.

Paul Beach, in his 1990 report on how the Navy’s A-12 stealth aircraft development program reached the point where it was cancelled for cause,<sup>9</sup> itself a rare instance of accountability, described the issue as follows:

The fundamental problem . . . is to create appropriate incentives to enable senior leaders to rely upon responsible, accountable line managers for realistic perspectives on the cost, schedule and technical status of their programs. Only by doing so can we increase efficiency and accountability while reducing the burdens imposed by undue regulation and stifling supervision.

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<sup>9</sup> The continuing litigation costs of this disputed cancellation have now reportedly exceeded the amount in dispute.

Unless means can be found to solve this abiding cultural problem, the failures evidenced in this report can be anticipated to occur again in the same or similar form.<sup>10</sup>

When the acquisition workforce, including middle and upper management, perceives there are limited, if any, consequences for following or not following certain policies, they subordinate those policies to other more immediately consequential considerations. Such considerations can include expected rewards for avoiding taking management actions that would imply schedule slips, or that would trade minor performance goals favored by senior service executives against cost.

A major reason for this current disconnect between the formal acquisition reporting chain and true accountability that acquisition executives are not the primary conduit for long- or short-term program funding. This is in direct contrast to industry practice where a program manager's agreement with his leadership usually includes funding guarantees.

### **C. Initiatives for Improved Accountability**

#### **1. Establish an Annual Operating Plan for each acquisition program**

The basic thrust of this section is that the Under Secretary of Defense (AT&L) should establish a new oversight process that utilizes tiered accountability. A more accountable acquisition management system could best be centered on an *annual operating plan*. This would largely avoid the problem noted above in which non-acquisition officials have authority over longer-term funding.

An Annual Operating Plan (AOP) based on approved 1-year funding could establish and measure progress on those events in the next 12 months that are on or near the critical path. If the AOP is based on the fiscal year, most funding changes and impacts are known by the August/September time frame, which provides sufficient time to set the next year's goals in a manner that is almost entirely under the control of the CAE, PEO, and PM.

The establishment of an Annual Operating Plan would more properly align responsibilities and authority within the Department's acquisition process, and permit

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<sup>10</sup> Chester Paul Beach, Jr., "A-12 Administrative Inquiry," 28 November 1990.

CAEs, PEOs and PMs to become more objectively accountable for the progress of their programs.

## **2. Establish A More Flexible and Accountable Acquisition Workforce**

DoD needs an acquisition workforce that is well trained, broadly experienced, and mobile. The Defense Acquisition Workforce Improvement Act (DAWIA) establishes a reasonable starting point, but more improvements are needed. In particular, management must be able to unilaterally deploy personnel where their talents and backgrounds are most needed. In addition, management needs to be actively engaged in career planning to ensure a deep pool of the best talent available. Management should adopt for the civilian acquisition workforce some of the characteristics of the Service's officer management programs. That does not have to mean an up-or-out policy, but it may mean an up-or-*stay put* policy.

On the other hand, if the current practice of rotating military program managers too frequently cannot be ameliorated, serious consideration should be given to staffing most DoD program offices with civilian program managers who will be expected to stay in place until the program phase succeeds (or is cancelled). Military officers could bring their valuable battlefield experience to bear as rotating deputy program managers.

### *Recommendations:*

- The Component Acquisition Executives (CAE) should be held responsible and accountable for their programs.
- DAE staff should be responsible for and given sufficient lead time and information by the CAE to prepare the DAE for the review, but not for deciding when and whether to hold a review.
- The Under Secretary of Defense (AT&L) should use the flexibility inherent in the new National Security Personnel System to exercise aggressive leadership in career management, creating a truly professional acquisition corps that is well and broadly trained, and easily deployed on an individual basis to where the skills are needed.
- Qualification requirements for PM selection should be more strictly enforced, as should the goals for keeping PMs in place through the full current phase of their program.

The foregoing changes would permit the Under Secretary of Defense (AT&L) to cut back on the size and function of the OIPT structure, thereby freeing up resources that could be applied to improving the technical readiness assessments and joint acquisition processes as recommended earlier.

#### **IV. BETTER ACCESS TO TECHNOLOGY**

The one area in this sector in which the Team believes a new initiative might be warranted is the needed amelioration of the decline of the US as the major source of new technologies of potential future importance to the Department of Defense. This decline stems from the globalization of science and technology research, the relative stagnation of DoD funding of U.S. science and technology, the overall decline of federal funding in this area, and the sharp decline in investment in long-term science and technology by most major defense contractors.

The Team believes that a minor initiative is warranted that would reexamine the decision that DoD made in the 1990s to decouple the allowability of industrial independent research and development (IR&D) spending in the overhead charges billed to government contracts from any formal evaluation of the potential value of such spending. Resumption of DoD “scoring” of the long-term potential of such spending as a factor in determining the extent to which it would be reimbursed by the government would likely reverse the decline in long-term industrial science and technology investments. It would also help government technical experts become and remain more fluent in emerging technical developments.

*Recommendation:*

DoD should conduct a short in-house evaluation of this restoration concept, and, if this Team’s assessment is sustained, promulgate the appropriate changes to DoD directives and accounting procedures.



## **BACKGROUND AND OVERVIEW**

The Institute for Defense Analyses (IDA), in cooperation with the CNA Corporation (CNAC)—the Team—was tasked, first, to review and assess the current status of the many acquisition initiatives that have been recommended and/or attempted in recent years and, second, to identify and analyze a subset of initiatives that the team finds to have potential for near-term management emphasis that could provide visible improvements to the much-criticized Defense acquisition system.

The Team is composed of several experienced senior managers and analysts who have had extensive experience in the management and oversight of defense acquisition programs at the OSD, Service, and industry levels. Membership of the Team is documented at Appendix A.

The results of Phase I were briefed to the sponsors on 25 September 2005, and the written Phase One report was subsequently provided to the sponsors as IDA Document D-3189. The present report documents the results of the second and final phase of the project.

The Team systematically reviewed the results of the Phase I research in order to identify those specific initiatives worthy of early consideration by the Defense Acquisition Executive. Coincidentally, two members of the Team (Gene Porter and Gary Christle) were invited to testify to the AirLand Subcommittee of the Senate Armed Services Committee on 15 November 2005 on problems in defense acquisition management. Preparation of that testimony provided an additional near-term focus for the Team's work on this Phase II report, which is generally consistent therewith.

### **A. TWO MAJOR ACQUISITION MANAGEMENT ISSUES EXCLUDED**

The Team did not review or assess the several ongoing efforts to provide increased authority and more responsive processes for rapid acquisition of key items of material needed to support current military operations. Our review focused on the processes and procedures for the long-term acquisition of military equipment and systems essential for properly equipping and supporting the future military force structure.

Additionally, the Team did not explicitly address the issue of perceived excess cost growth in major weapons systems other than by implication in the areas of funding stability, requirements creep, and improved systems management. A separately tasked study at IDA is explicitly investigating the cost growth issue.

## **B. INITIATIVES REVIEWED AND RECOMMENDED FOR FURTHER USD(AT&L) ACTION**

This Phase II report first focuses on three major initiatives and then concludes with a review of a fourth minor initiative:

1. **Better integration** of Requirements/Resources/Acquisition management processes into a system that provides for both better **Joint outcomes** and greater **funding stability** (Section I).
2. Potential improvements to in-house **systems management** (section II).
3. **Strengthen accountability** in the acquisition management chain (section III).
4. Improved access to technology (section IV).

## **I. IMPROVED PROGRAM STABILITY AND “JOINTNESS” OUTCOMES THROUGH BETTER INTEGRATION OF REQUIREMENTS/PROGRAMMING/ACQUISITION PROCESSES**

One dominant theme of our research is that the Packard Commission had the important “what to buy” management principle about right, but that those elements of the Packard Commission recommendations that would have empowered the Under Secretary of Defense [USD(AT&L)] to effect such a change were never fully implemented.<sup>1</sup>

But one major emergent challenge that has proved to be important to defense acquisition management practice was missing from the earlier Packard recommendations: the widely recognized need to improve policies and procedures that encourage more and better “joint” acquisition. Lack of progress toward joint acquisition is exemplified by the lack of a formal DoD joint acquisition management structure, except at the Special Operations Command (SOCOM) and at the Defense Agencies.

The difficulty in getting good “joint” outcomes from the DoD acquisition process is directly related to the weak integration of the Department’s weapons system requirements process, the formal acquisition management process, and the programming/budgeting process.

The process integration problem and the associated funding instability will be addressed first, and joint acquisition later in this section. These problems together underlie many of the major current issues on acquisition management. The problem of the excessive cost growth of the minority of DoD acquisition programs that contribute to the majority of overall cost growth is being addressed in detail in a separate ongoing IDA study. Most such cases of excessive procurement cost growth resulted from causes other than instabilities in funding.

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<sup>1</sup> This discussion of this issue is supplemented by a legal analysis of the USD(AT&L) authority in such matters that was submitted as Appendix B in the Phase I Report, IDA Document D-3189.

## **A. INTEGRATION OF DOD PROCESSES: THE “REQUIREMENTS” PROBLEM**

### **1. Requirements Formulation**

A key step in sound acquisition program planning is to establish realistic, achievable, and affordable statements of the intended principal characteristics of a notional new weapon system. There is an ongoing tendency in some quarters to consider the final establishment of such “requirements” as quite separate from the acquisition process itself—a distinction that is unfortunately reflected in current DoD Instructions. That is not what the Packard Commission recommended, nor is it consistent with the legislation that established the position of the Under Secretary for Acquisition. The USD(AT&L), acting on behalf of the Secretary, has both the responsibility and authority to decide the key characteristics of the equipment the Department will ask the President to request Congress to fund.

It is highly appropriate that the nation's warfighting experts, both the Combatant Commanders, and the Chiefs of the Military Services, be deeply involved in the deliberations that lead to establishing a formal acquisition program. Indeed, the Service Chiefs in particular are routinely heavily involved, not only in identifying needs and advising on the requirements at the start of programs, but also in many of the ongoing cost-performance trades that are made as a program proceeds through development and into production. Well-known examples include the Army's Future Combat System, the Navy's Littoral Combat Ship, and the Air Force's F-22A programs. The characteristics, quantities, and timing of the programs were each proposed by their respective Service Chiefs, who have continued to be heavily involved in decisions on key cost-performance trades as the systems proceed through development. The more central a weapon system is to a Service's vision of its own core competency and preferred warfighting doctrine, the stronger the involvement of the Service leadership in the conduct of the acquisition.

Indeed, in some circumstances senior Service official's influence on “requirements” is so pervasive and detailed that the Program Manager has insufficient flexibility to trade cost and performance, as discussed below and in Section II.

In addition to the primary role of the Services in proposing new weapons systems, the Chairman of the Joint Chiefs of Staff has established a formal process by which his staff develops advice that is provided to the Defense Acquisition Executive (DAE) as to what the Department should acquire to meet a recognized need—particularly from the

viewpoint of the Combatant Commanders and the joint warfighting community.<sup>2</sup> But the team is aware of no major new weapon system that proceeded into the acquisition process after first being proposed by a Combatant Commander or other joint entity.

Regardless of the source of the original proposal that a new system be acquired, it is the DAE who ultimately makes decisions on the weapons needed to help meet the Department's overall capabilities goals. The DAE considers the advice provided by the members of the Defense Acquisition Board—ideally after examining the results of an objective, broad Analysis of Alternatives that the DAE helped structure, and before a contracting source is selected. For this process to work well there needs to be close cooperation between the warfighting “customers” and the acquisition executive, as was envisioned by the Packard Commission's unimplemented recommendation for the establishment of a Joint Requirement's Management Board (JRMB).

Even before decisions are made on specific system performance objectives, there also needs to be close cooperation between the Acquisition Executive and the other members of the Secretary's planning and programming community—principally PA&E—to ensure that an appropriately broad range of alternatives is fully considered—a process that has not always occurred in recent years.

In addition to the sometimes lack of “due process” in establishing the analytic basis for a new acquisition program, once a new program is started, as noted above, the detailed performance requirements and other characteristics are sometimes still specified in such detail by senior Service officials that the program manager (PM) has little room for making the sort of cost-performance trades for which, most agree, the PM needs both authority and latitude to decide for costs to be adequately controlled. The degree of such cost-performance flexibility that has been provided to the F-35 Joint Strike Fighter program managers is a rarity.

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<sup>2</sup> The JCIDS process originated as an attempt to modernize the process for developing “required” weapon system performance characteristics. The JCIDS schema is being misunderstood in that its use of the term “approve and validate” rather than “advise and assist the CJCS” is causing confusion about and proliferating the idea that requirements decisions are uniquely military and are separated from civilian acquisition decisions. In addition, the JCIDS process is now cast as a process for defining the overall capabilities needed by the entire Defense Department, as seen by the Joint Staff. As such, it is not at all clear how this broad, fiscally unconstrained, military look at 100% of the defense program should routinely interface with the acquisition process that deals with the 25% of the defense program allocated to weapons systems.

Secretary Kenneth Krieg and two of the Service Acquisition Executives recently testified that they, along with their military counterparts, the Vice Chairman of the Joint Chiefs of Staff, and the Service Chiefs, are increasingly involved in making such cost-performance trades on ongoing major programs. As a result, some performance goals (formerly “requirements”) are reportedly being significantly altered in order to better balance cost and performance risks. As noted earlier, involvement in such activities by the civilian acquisition executives were an important element of the Packard Commission recommendations.

## **2. Requirements Creep**

The pejorative term “requirements creep” doesn’t always imply poor management. Indeed, in most major programs that are expected to take over a decade to proceed through risk reduction, system design and development, and initial production, the government should be open to worthwhile changes that may add “up front” costs, if that added cost can be justified and funded without undue risk to other capabilities. Such worthwhile changes can include revised responses to changing threats, the unplanned availability of new technology that can lower future production costs, and engineering changes that lead to worthwhile reductions in operating and maintenance costs. Many such changes are clearly in the Department’s interest, but they should be made in a manner that demonstrates their appropriateness via the appropriate acquisition executive’s requirements review process, and they should be clearly explained as prudent to the Congress.

In keeping with this concept, a 2004 IDA study on the reported growth of costs of 138 defense programs attempted to differentiate between growth due to “decisions” such as changing performance requirements or changing production rates, and growth due to “mistakes,” such as erroneous estimates of labor hours or material costs, or premature entry into system development before technical risks have been reduced to the prescribed level of acceptability.<sup>3</sup> IDA found that about half of the cost growth in development programs and one-third of the (smaller) growth in production programs was due to deliberate “decisions” rather than “mistakes.”

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<sup>3</sup> David McNicol, *Cost Growth in Major Weapon Procurement Programs*, IDA Paper P-3832, 2004.

## **B. THE INTEGRATION OF DOD PROCESSES: STABLE ACQUISITION PROGRAM FUNDING**

The Department has developed an elaborate and effective set of procedures for the detailed planning and management of acquisition programs—procedures that, when followed, *and when accompanied by stable funding*, have generally produced good results, given the complexity of large DoD acquisition programs. But the success of the “baseline” plan is highly dependent on the availability of the planned funding. Therefore, any significant change to the postulated funding profile—almost always a reduction—is usually disruptive to even the best-planned and most technically stable program. The usual disruption involves the stretching out of programs into the future, with attendant delays in fielding of needed capabilities, and increased total costs, even if only associated with the lengthened period of incurred “overhead” costs.

Frequent—indeed chronic—changes in the actual funding provided to acquisition programs compared with the initially approved funding profiles is a widely recognized, but not necessarily dominant, cause of program cost growth.<sup>4</sup> On the other hand, factors other than funding instability tend to dominate the causes of cost growth for the minority of programs that contribute to the majority of the growth of the overall acquisition costs of the Department. Regardless of the specific uncertainties of the causes of cost growth on individual programs, there are actions the USD (AT&L) could pursue in the area of better integration of the acquisition and resource allocation systems that would help stabilize program funding. These potential stabilization actions are summarized below. The first one of these actions could have a major impact.

### **1. Funding Stability Issue 1: Mitigation of the Migration of Planned Acquisition Funds to the Operating Accounts**

The mismatch between the Department’s ability to carefully forecast the funds needed in the future for each approved weapon system and the Department’s ability (or willingness) to forecast its needs for future operating funds is an important contributor to the instability of acquisition program funding. Given that DoD must always constrain its *total* funding plans to the level prescribed by the long-range budget plans of the President and Congress, every year the Department is faced with the need to cut back on previously

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<sup>4</sup> Work in progress at IDA indicates a need for much better recording and retention of program content and funding decision documentation if uncertainty in the causes of program cost growth are to be reduced.

planned and approved acquisition spending in order to meet unplanned needs for operating and maintenance (O&M) funds and military personnel (MILPERS) costs.<sup>5</sup>

This source of instability in acquisition program funding is chronic—not just associated with either the current high tempo of unplanned operations or with deficit concerns. Indeed, a former Deputy Secretary of Defense recently characterized DOD’s long-standing budgeting practices for O&M and MILPERS as knowingly “dishonest.”<sup>6</sup> The acquisition program “cuts” imposed as a result of this habitual practice are usually broadly spread across most acquisition programs, requiring that most programs be replanned in detail and at some increase in total cost. And the cause of this type of instability is not confined to actions in the executive branch across the 5-year plan. In some former years the Congress would level a “tax” on DoD in the form of an undistributed reduction for the imminent budget year that would have the same broad destabilizing effect.

Because this impact results from purely budgetary considerations and not from changes in the threat, or acquisition program problems, or other changes in a particular program, it is difficult to argue within DoD that any particular program, or set of programs, should be sacrificed in order to protect the stability of the remainder, although most agree that such vertical cuts would be sensible.

Clearly, a broad solution to this problem of annual transfers of previously planned acquisition funds to operating and personnel accounts would be for the Department to plan its long-term O&M spending to the same “most likely cost” criteria that it tries to apply to the planned cost of its weapons systems. For this reason, it is important that acquisition program planning be more closely coordinated with the Department’s overall resource allocation and budgeting processes. The latter is particularly challenging in that decisions on acquisition programs are largely *event driven*—completion of development, etc.—and budgets are *calendar driven*. It is a hopeful sign that Secretary Krieg, in his recent testimony, continued to emphasize the need to better integrate acquisition and resource management. The Team believes that real progress will occur in this area only if the Secretary himself demands it. The DAE has little formal leverage over the budgeting of operating, maintenance, and military personnel funds.

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<sup>5</sup> See the testimony of former Deputy Secretary of Defense John Hamre to the Airland Subcommittee of the Senate Armed Services Committee on 15 November 2005.

<sup>6</sup> Ibid.



## **2. Funding Stability Issue 2: “Fencing” Is Not the Solution to Stabilizing Funding**

From time to time the suggestion is made that, once an acquisition program has been thoroughly reviewed and approved by the Defense Acquisition Executive, the associated funding profile that would lead to the next major milestone should be “fenced,” i.e., exempted from further adjustments, such as those frequently made during the annual budget preparation cycles. Indeed, the recently completed Defense Acquisition Performance Assessment project made just such a recommendation.<sup>7</sup>

As important as improved funding stability is to the coherence and efficiency of acquisition program management, it is not more important than the Department’s ability to respond agilely to changing threats, risks, and total funding availability as it prepares budget proposals. Under current procedures, fencing the funding for some acquisition programs would have the effect of further destabilizing others. For this reason, except for occasional isolated programs of great strategic importance, Secretaries of Defense have prudently, in the Team’s judgment, been reluctant to mandate that specific levels of funding be earmarked for specific acquisition programs as the Services annually update their long-range plans in response to his guidance.

## **3. Funding Stability Issue 3: The Need for Planned “Reserves”**

The lack of DoD “Management Reserves” is frequently cited as a source of program instability. Managers of civil projects ranging in complexity from building a single-family home to tunneling under a major city know they cannot accurately predict the total cost just by adding up costs of each of the initially planned steps known to be needed. There are always “unknowns,” and even “unknown unknowns,” that drive up the final cost. Builders who promise a result at a fixed price always include some unallocated contingency reserves in their bids based on their professional experience, or they would soon be bankrupt.

In sharp contrast to private sector practice, the major segment of the DoD acquisition spending that is devoted to research, development, test and evaluation, and most of the remainder that goes to procurement spending, is contracted not on a fixed-price basis, but using cost-type contracts. In principle, the Department could—and should—include prudent contingency reserves in the estimates of both development and

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<sup>7</sup> <http://www.acq.osd.mil/dapaproject>.

procurement costs. In practice however, there is a bias against such prudent planning in large part because there is always some need that is more tangible than the unknowns that motivate planning for reserves.

The use of independent cost estimates has proven useful for establishing program “baseline” costs that are generally more likely to be accurate than are “bottoms up” program cost estimates that are devoid of reserves. The Department has long supported an independent Cost Analysis Improvement Group (CAIG) dedicated to improving its estimates of future costs of major weapons systems. It has also supported Service independent cost estimating capabilities. Based on IDA’s previously cited 2004 examination of data on 138 programs, it appears that the decades-long effort to align DoD acquisition procurement budgets with the results of truly independent cost estimates has been modestly successful in reducing apparent production cost overruns. That analysis showed that about 75% of the cost growth in production programs was attributable to only about 25% of the programs—outliers beyond the expected normal distribution of estimate errors. Many of these outliers are thought to be attributable to technological immaturity at the time the initial cost estimates were made, as discussed in Section II of this report, as well as some “requirements creep” that may or may not have received sufficient oversight.

Because of the uniqueness of every development program, and the sparseness of analytic tools, independent estimates of *development* costs have proved somewhat less reliable than those for *production* costs. Furthermore, despite DoD policies that support the use of CAIG cost estimates for establishing Acquisition Program Baselines (APB) and Selective Acquisition Reports (SAR) to Congress, the siren song “this program is different” has often led to the acceptance of cost estimates that are lower than those provided by the CAIG. Such practices lead to the Department’s tendency, on average, to accept rosy forecasts of development costs

The need for planned reserves is, of course, a long-standing issue. In past years the Department has tried several different approaches to establishing prudent levels of reserves, at least in its outyear plans, that can be allocated as needed to salvage troubled programs, or accommodate other sensible changes, without having to tax and destabilize others. In all cases, such schemes have been abandoned after only a few years, or even

months, because of the difficulty in holding back funds—even outyear funds—against unknown eventualities, when there were so many competing demands to meet known needs.

The Team’s sense is that the stability of acquisition programs is important enough to warrant yet another try at establishing such a reserves program—not necessarily for the budget year, but surely for the outyear plan. The extent to which such reserves should be held at the Program Executive Officer (PEO), Service Acquisition Executive (SAE,) or Defense Acquisition Executive (DAE) level has not been addressed in this project

#### **4. Funding Stability Issue 4: Emerging, Unplanned, Programs**

An additional source of instability is a decision to move a promising experimental program that had not been planned for full-scale development and production into the formal acquisition system. The Department funds a variety of promising experiments that each have some prospect of becoming worthy of longer-term funding than originally planned. Such programs are typically managed by the Defense Advanced Research Projects Agency (DARPA) or in the Department’s Advanced Concept Technology Demonstrator (ACTD) portfolio. If one or more such programs are tested and found to warrant prompt inclusion in the Department’s long-term program plans, they usually must displace one or more other programs—a destabilizing activity that has a chilling effect on the mainstream defense acquisition community’s enthusiasm for such programs.

One obvious solution to this threat would be for the Department to create a standing outyear “wedge” of unallocated funds, some of which could be shifted annually to fund emerging good ideas without disrupting other programs. A problem with this approach is similar to that for establishing an outyear reserve for funding troubled programs and other program changes—there would be a significant one-time destabilization of other programs in order to establish such contingency accounts.

The Team judges that the problems that would be entailed in attempting such a large one-time reallocation of planned funding outweigh the problems entailed in continuing the current case-by-case decision process. Stability could still be increased, however, if the necessary offsets were to be identified as vertical cuts of specific programs rather than as broad taxes across many programs.

## **5. Funding Stability Issue 5: Milestone Budgeting**

A different step toward stabilizing the funding for the development/initial production phase of programs would be to shift to “milestone budgeting” as recommended by the Packard Commission. Under this approach the full estimated cost of development, and perhaps the first year or two of initial production, would be appropriated and managed as a lump sum in much the same way that the cost of a new lead ship used to be appropriated and managed. A full-scale change to such a procedure would have a major impact only on obligational authority, but not on actual outlay rates, as the funds would be actually expended at approximately the previously planned rate. The benefit would be the greatly increased ability of program managers to efficiently plan and execute the multiyear activities of their development programs due to the confidence they would have in the availability of funds.

Despite the attractive features of this concept, the Team believes that, as with establishing a wedge for new ideas, the one-time apparent cost of shifting all acquisition programs to milestone budgeting, including the likely difficulties associated with perceived reductions in congressional oversight, outweigh the likely benefits of devoting a major near-term effort to this potential management initiative. However, one or more pilot projects of this type could be pursued to demonstrate the benefits.

### **C. THE INTEGRATION OF DOD PROCESSES: BETTER JOINT PROGRAM AND ACQUISITION PLANNING**

The impediments to jointness in the Department of Defense acquisition program planning are well known. Although the Goldwater-Nichols Act is widely acknowledged to have led to significant improvements in the planning and execution of joint military *operations*, its impact on increasing the jointness of the Department’s long-range *program planning* process, including its acquisition program planning, has been much less impressive to date.

It may be overly simplistic to contrast the apparent “internal” jointness between the air and ground elements of the US Marine Corps with the ongoing difficulties in achieving similar synergies between the Army and the Air Force, but there are two important features of successful joint acquisition projects that can be illustrated using that analogy: (1) joint operating concepts, and (2) joint funding.

## 1. Joint Operating Concepts

First, a common, unified concept of how to operate together not only improves field performance, but is essential to real jointness in acquisition. The Marines pride themselves on having established effective operational concepts for air-ground operations across a broad range of combat scenarios. The unity of such concepts is widely advertised as integral to their “MAGTF” organizational structures. However, joint operating concepts and joint integrating concepts that cross the boundaries of the other Services are much less well developed.

It is difficult to make a lot of progress in defining an acceptable set of joint requirements for new equipment that would be operated by multiple Services (or operated in a mutually dependent fashion among two or more Services) in the absence of agreed, and relatively specific, joint operating concepts. The Joint Staff is working to develop a broad range of joint operating and integrating concepts to address this need, but progress is glacial. This, plus the joint funding issue discussed below, constitutes the major impediment to achieving the long-standing goal of having acquisition programs “born joint.”

The closest the Department has come in recent years to a successful major joint acquisition program is the Joint Strike Fighter—now the F-35. Research at IDA into the differences between the originally joint F-111 program that reverted to a single Service, and the largely successful (to date) joint F-35 program, identified one overriding factor.<sup>8</sup> In the F-111 program the Navy and Air Force failed to agree on an acceptable set of joint performance requirements, largely because of differing operating concepts. Such agreement on performance requirements, reached early in the F-35 program, has largely persisted through many changes, by virtue of the joint management and funding structure.

But the F-35 type of “jointness” flows more from a desire to save acquisition and maintenance costs through the use of common equipment than it does from the need to operate more jointly. Even with common airframes, the Services could in principle equip them with uncommon sensors, communications equipment, and weapons—the type of equipment more important to true joint operations than is airframe commonality.

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<sup>8</sup> David McNicol et al. *The Accuracy of Independent Estimates of the Procurement Costs of Major Systems*, IDA Paper P-3989, August 2005.

The lack of planned interoperability among the military services is not a new problem even though warfighters in the field have a recent record of moderately successful last-minute improvisation. that ends up getting the job done, albeit at considerable expense in time and efficiency. In discussing the acquisition of equipment important to the interoperability of US forces, the 2004 report *Beyond Goldwater-Nichols* (BG-N) from the Center for Strategic and International Studies stated:

This enduring lack of jointness in how DoD procures weapons has both raised the cost of military operations (e.g., persistent interoperability problems cause friendly fire casualties) and constrained the growth of US military capabilities (e.g., Services invest too much in duplicative capabilities and too little in Low Density/ High Demand assets).

Nowhere is the need for improved coherence in the acquisition of military capabilities more apparent than in command, control, and communications systems. Citing “repeated failures over the past decade to develop common, interoperable” command and control systems, the aforementioned CSIS report explicitly recommended that funding and responsibility for managing such programs be transferred from the Services to a new joint management entity.

The Department is looking broadly into the planning for such joint command and control and supporting information infrastructure programs. The central issue being addressed is reportedly how to assure that separately acquired and fielded programs provide the necessary integrated joint capabilities, and not the joint acquisition and management approach recommended by CSIS and others.

Although the Under Secretary for Acquisition, Technology and Logistics has both the responsibility and authority to decide what the Department will propose to buy, he is not chartered or staffed to establish joint operating concepts. The absence of such joint concepts, which can be particularly difficult when they open up Inter-Service Title 10 roles and missions issues, too often become apparent only very late in the process of establishing new Service-unique acquisition programs. A recent example involved the DAE exercising his authority by delaying an Army plan to issue an RFP for a new tactical airlift plane in order to provide an opportunity to establish a joint Army/Air Force program for acquiring a common aircraft.

The Team was encouraged to read Secretary Krieg’s testimony of 27 September 2005 in which he reported that he, too, believes the Department’s requirements and acquisition processes must be better integrated, and laid out his

principles for achieving that end. He has reportedly moved to take a greater role in the examination of requirements, not only for major defense acquisition programs (MDAPs) but also for those other programs that may not meet the MDAP cost thresholds but are vital enablers to future joint military operations, such as command and control systems. This latter consideration reinforces the Team's belief that a greater degree of unity could be achieved in DoD's acquisition management practices if the command and control-related acquisition programs now structured and overseen by the Assistant Secretary of Defense, for Networks and Information Integration [ASD (NII)]; the Commander, Joint Forces Command; and the Joint Staff (J-6) were more clearly brought within the purview and processes of the USD(AT&L).

Similarly, the Team notes the lack of a management mechanism for examining the prospects for "joint" Special Acquisition Programs (SAPs). At present it appears that the Services each establish and manage their own SAPs, and control access thereto, in ways that largely preclude consideration of joint applications. As with the acquisition programs now overseen by NII, the Department's Special Access Programs would likely benefit from greater oversight by the USD(AT&L), with early attention given to potential joint applications.

## **2. Joint Funding**

Second, a single flow path for funding clearly helps. When the Marines plan their future spending programs, they can internally resolve issues and assemble, at least within the Department of the Navy, a coherent long-range program plan for the several systems important to effective joint air-ground operations. Counterexamples include the integrated radar and missile air defense systems that were developed separately by the Army, Navy, and Air Force, which work well within, but not across, Service boundaries. There are no examples of single sources of funding for successful major cross-Service weapons acquisition programs that have been fielded. The Missile Defense Agency (MDA) has a single source of funding only for the development of ballistic missile defenses, not their production, fielding, and support. One could argue, moreover, that the recent success of the Navy Aegis Ship in intercepting test vehicles was a direct result of MDA "joint" development funding, and would not likely have been directly funded by the Navy.

For the most part, "purple" or "joint" funding of common support activities has proven its worth. Despite their considerable birthing and growing pains, such DoD-wide

activities as the Defense Logistics Agency, Defense Information Services Agency, Defense Finance and Accounting Service, and the Defense Contract Management Agency, are widely agreed to now be working well and are considerably less costly than would have been the case had the Services each retained such functions. Additional implementation of such “joint” funding appears to be a necessary condition for achieving much real progress towards joint acquisition.

In fact, it may take another Herculean effort, such as that that went into the Goldwater-Nichols Act itself, to boldly move the Department into a new approach to acquiring capabilities that are truly “born joint.” It seems unrealistic to expect much more progress toward improved joint acquisition without a major effort by both the Secretary of Defense and the Congress.

#### **D. RECOMMENDATIONS FOR IMPROVING PROGRAM STABILITY AND JOINTNESS**

The foregoing assessments suggest that the following three “requirements” and “funding stability” items warrant the Under Secretary’s consideration for renewed near-term emphasis:

1. The establishment of a more robust process for identifying and analyzing broad alternatives for meeting needed capabilities well before the Defense Acquisition Board is asked to review, and the DAE must decide on, specific characteristics of a new weapon system and a schedule for it,. The USD(AT&L) would be a co-equal with PA&E in this strengthened AoA process. This process would precede but be closely associated with a revitalized “Milestone A” process that is intended to elevate attention to needed jointness considerations, technology maturation, and systems engineering practices prior to formal Program Initiation at Milestone B, as described below and in section II of this report. Getting acquisition programs started on a sound technical and financial footing is much better than having to salvage and restructure troubled programs later.
2. A proposal to the Secretary and the Under Secretary of Defense for Personnel and Readiness [USD(P&R)] and the Under Secretary of Defense (Comptroller) [USD(C)] for improved accuracy in the forward planning of



O&M and MILPERS costs to be overseen by the Secretary's principal staff assistants in those areas.

3. Reestablishment of a process for programming suitable levels of reserves for acquisition programs in the years beyond the budget year. The appropriate holder of such reserves (DAE/SAE/PEO) would be subject to additional near-term study.
4. To promote and facilitate joint acquisition activities, the USD(AT&L) could realign his staff such that one segment would have a primary cross-mission responsibility to seek out emerging Service acquisition programs that have potential for joint acquisition such as at the revitalized Milestone "A" point discussed in the preceding section—well before they are formally brought to the Defense Acquisition Board (DAB) for Milestone "B" Review.
5. The Under Secretary should more routinely exercise his authority over those acquisition management activities particularly important to joint warfighting (including "requirements" determination) that have migrated to other offices, particularly CIO, NII, and Service SAP offices. This measure would help restore unity to acquisition management and oversight.

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## **II. IMPROVED OUTCOMES THROUGH BETTER SYSTEMS MANAGEMENT PRACTICE**

A major thread of the Packard Commission's recommendations was to "fly before buy." Secretary Krieg now calls it "try before buy." However it is stated, this concept remains as valid today as it was almost 20 years ago. In fact, it could be argued that it is even more valid today because there is no major new threat so imminent that sound system engineering management practices need to be sacrificed in order to accelerate the fielding of unproven major equipment. Although the importance of systems management is embedded in DoD policies, these policies have been insufficiently heeded in recent years.

The Department has relied heavily on three key tools that are intended to implement this principle: One is working well (operational testing); the other two are not (systems engineering and technology readiness assessments), as discussed below.

### **A. FORMAL OPERATIONAL TESTING**

Significant benefits have accrued to our warfighters by independently ensuring that their equipment has demonstrated both operational effectiveness and suitability in the field. US military equipment is the envy of the world's fighting forces, in large part as a result of rigorous and independent testing. The integrity of this process was supported by establishing a direct reporting relationship between the Director of Operational Testing and the Secretary of Defense. In addition to verifying the readiness of a particular system to be fielded, the data collected during the operational testing of many systems provides insights into problematic trends in DoD's systems engineering practices, as discussed below.

One complaint about the current operational testing process is that the testing community is sometimes seen as testing systems against obsolete "requirements". In this regard, as the USD(AT&L) increases his involvement in overseeing the requirements process as discussed in Section I of this report, a productive avenue of activity would be to establish a process that better ensures that formal requirements documents and associated "test plans" are kept current. Although important, the Team does not believe this recommendation merits a major initiative at the Defense Acquisition Executive level.

## B. ADEQUATE SYSTEMS ENGINEERING IN PROGRAMS

Good systems engineering is critical to the successful development and production of complex weapons systems. Things will inevitably go wrong when an **event-driven** systems engineering process is improperly dominated by a **schedule-driven** systems integration environment. Cost-performance trades are being made too late, and immature technology is being relied upon too often. As a result, rework ensues, schedules slip, and cost grows.

The consequences of poor systems engineering discipline have been well documented. The particular problems associated with the risk of proceeding into full-scale development with immature but critical technology will be treated in a subsequent subsection. The general problem is illustrated by the results of a recent Government Accountability Office (GAO) report that found that at their point of critical design review (CDR), only 42% of DoD's programs demonstrated adequate design stability.<sup>1</sup>

- Development programs **with** stable designs at CDR averaged 6% subsequent cost growth.
- Development programs **without** stable designs at CDR averaged 46% subsequent cost growth and a 29-month schedule delay.

While DoD has not confirmed these specific estimates, there is little doubt as to the general accuracy of implication: unstable designs at CDR presage large growth in costs.

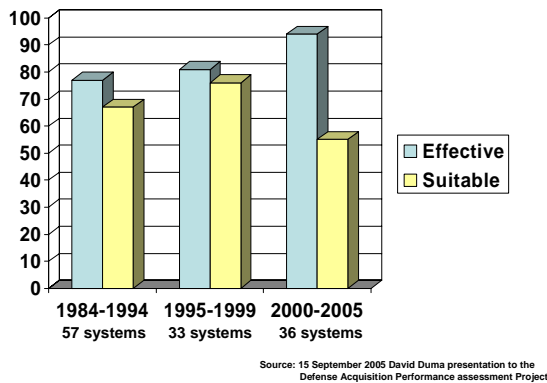
The consequences of weak systems engineering not only involve short term cost growth and schedule slips, but extend to increased operating and support costs after weapons systems are fielded. Operational testing prior to full-rate production is intended to demonstrate the achievement of the two most important aspects of weapon system performance: (1) nominal combat effectiveness when employed as envisioned, and (2) battlefield suitability in terms of reliability and supportability etc. Both attributes are of comparable importance in judging the success of an acquisition program.

In recent years there has been a substantial drop in the percentage of systems passing suitability testing, while at the same time nominal combat effectiveness passing rates have increased. These trends are shown in Figure II-1.<sup>2</sup>

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<sup>1</sup> Defense Acquisitions: Assessments of Selected Major Weapon Programs, GAO-05-301, March 2005.

<sup>2</sup> There has been a trend of more systems passing operational test from an effectiveness perspective. This trend is primarily the result of a change in testing philosophy. Early on, tests were mostly conducted on a



**Figure II-1. Percentage of Systems Passing Operational Test**

Declining suitability numbers and their divergence from the effectiveness numbers clearly demonstrate that both government and contractor program offices are shifting emphasis away from the suitability goals whose achievement is highly dependent on sound systems engineering practices. Resources needed to meet suitability goals (which themselves have been deemphasized as testable contractual obligations) are often diverted to deal with technical performance problems with the hope that suitability can be improved after production starts—usually at increased cost. The drop in suitability shown in Figure II-1 can also be attributed to a decline in systems engineering expertise in program offices based on an overreaction to “acquisition reform” initiatives as described later in this section.

A systems engineering problem of comparable importance to that of declining suitability is the weak application of current rules for ensuring that technical risk has been adequately limited, as discussed in section II.C, below.

Having perceived problems with systems engineering in major DoD acquisition programs, Under Secretary Edward C. “Pete” Aldridge Jr.<sup>3</sup> established a goal to drive good systems engineering practice back into the way DoD does business. To this end, in late 2002 he established an office in OUSD(AT&L) dedicated to spearheading these efforts.

A number of parallel studies have been conducted to identify the specific system engineering concerns that needed to be addressed. In January 2003, a National Defense

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pass-fail basis against a specific (and sometimes arbitrary) number. In today’s environment, testing is based on the ability to accomplish the mission.

<sup>3</sup> The Under Secretary of Defense for Acquisition, Technology and Logistics from 8 May 2001 to 23 May 2003.

Industry Association (NDIA) study reported the following issues from both government and contractor perspectives:

- Lack of awareness of the importance, value, timing, accountability, and organizational structure of systems engineering on programs
- Unavailability of adequate, qualified resources within government and industry for allocation on major programs
- Insufficient systems engineering tools and environments to effectively execute systems engineering on programs
- Poor initial program formulation
- Requirements definition, development, and management is not applied consistently and effectively

A 2004 DoD-directed study cited similar issues as root causes of failures in acquisition projects:<sup>4</sup>

- Inadequate understanding of requirements
- Lack of systems engineering discipline, authority, and resources
- Lack of technical planning and oversight
- Stovepipe developments with late integration
- Lack of subject matter expertise at integration level

All of these issues are predominantly driven by the poor application of sound systems engineering practices in acquisition programs.

To confirm the foregoing observations, a recent NDIA survey asked industry members, “How would you rate the quality and/or effectiveness of the [government] customer’s program manager systems engineering capability?” As reported in a May 2005 Systems Engineering Town Hall, the synthesized answer was: “Presently, even within a given Service, this varies significantly from program to program. There is a decided lack of systems engineering capability and understanding *compared with pre-acquisition reform days.*” (*emphasis added*)

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<sup>4</sup> As reported in the DoD Systems Engineering “Town Hall,” 18 May 2005.

This survey response helps explain the data divergence shown in Figure II-1 and confirms a significant decline in the Department's attention to sound systems engineering practices. Still, the Defense Acquisition University did not stop teaching good systems engineering practices as a result of Acquisition Reform. Similarly, competent systems engineers in the workforce did not all retire or forget how to do the job; there are literally thousands of them left (albeit fewer of them because of recent hiring freezes).

The Team believes that the observed deterioration in DoD systems engineering discipline is an unintended consequence of two key tenets of the Acquisition Reform efforts of the 1990s:

- Increased reliance on the defense industry itself to oversee complex acquisition programs
- Reduced government oversight activities that industry believed led to increased cost and schedule slippages

It appears that in many cases the Department's response to these reform initiatives went too far both from a technical perspective and from a program management perspective. Not only did the Department nearly eliminate its involvement in systems engineering technical details by assigning many fewer systems engineers to each program office, the Department also severely curtailed the extent of its systems engineering oversight. This effect was compounded by reform-driven reorganizations in OUSD(AT&L) that deemphasized the systems engineering policy function—reorganizations that were also mirrored in the Services.

As part of the attempt to reduce oversight practices that industry found intrusive, many new development contracts eschewed the traditional requirements for the types of formal reliability and supportability pre-production testing that previously resulted from more thorough government systems engineering oversight. The resulting lack of contractual requirements for testable “suitability” measures appears to have contributed directly to the deterioration of “suitability” in operational testing as shown in Figure II-1

Having observed some of the deleterious effects of previous changes, the USD (AT&L) Systems Engineering Office promulgated robust new policy and guidance intended to correct these problems,<sup>5</sup> but recent program assessments indicate that the problems persist.

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<sup>5</sup> DoD Directive 5000.1, *The Defense Acquisition System*, 12 May 2003; DoD Instruction 5000.2, *Operation of the Defense Acquisition System*, 12, May 2003; *The Defense Acquisition Guidebook*, <http://akss.dau.mil/DAG/>; USD(AT&L) Memorandum Policy for Systems Engineering in DoD,

For example, the systems engineering plans long required at major acquisition milestones have been consistently inadequate. While program managers probably understand that placing resources and management attention on systems engineering will be good for the program in the long run, short-term issues continue to receive the greater priority in many instances.

If all of the systems engineering management conditions for a successful program were to be met before formal program initiation at Milestone B, program managers would be in a much better position to maintain cost and schedule. This contrasts sharply with the current situation in which systems engineering plans are hastily drafted just prior to Milestone B and therefore do not inform or in some cases even reflect the important multiyear risk reduction efforts that should have been started at Milestone A in order to achieve acceptable levels of technical risk by Milestone B. Under current practice, real oversight of MDAPs by the USD(AT&L) doesn't currently begin until Milestone B is imminent. **Greater** scrutiny starting at Milestone A, combined with more strictly enforced technical maturity and systems engineering criteria for formal program initiation, should lead to significantly **less** scrutiny later in the acquisition cycle. The net result would be an overall reduction in OSD oversight and a shift of staff effort away from trying to help salvage troubled programs and toward better early program planning and execution.

### C. TECHNICAL READINESS ASSESSMENTS

Unambiguous DoD policy and guidance requires that certain levels of technology maturity be demonstrated before formal acquisition program initiation at Milestone B. It is widely acknowledged that this guidance is too often being waived.

DoD Instruction 5000.1, which addresses the operation of the Defense Acquisition System, established a requirement to perform a technology readiness assessment (TRA) prior to formal program initiation and set an entrance criterion that the “technology ... shall have been demonstrated in a relevant environment or, preferably in an operational environment, to be considered mature enough to use for product development in systems integration ... if the technology is not mature, the DoD Component shall use alternative technology that is mature and that can meet the user’s needs.”

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20 February 2004; USD(AT&L) Memorandum Policy Addendum for Systems Engineering, 22 October 2004.



As the Congress recognized when it passed Section 804 of the National Defense Authorization Act of Fiscal Year 2002, and as the GAO noted in its recent reports, the Department and its component Services have too often departed from these well-established rules. Programs continue to suffer cost and schedule growth as a result of proceeding into system development before key technologies are sufficiently mature.

One reason why acquisition executives frequently waive these clear requirements is that, under current DoD oversight practices, the specific technical risks faced by emerging programs have very little visibility prior to being considered at the point of formal program initiation – Milestone “B.” At that point program schedules have been established and outyear funding laid in such that Milestone B disapproval because of technical immaturity would seriously disrupt the Service’s plans, including the award of the system development and demonstration contract. A more formal requirement for early identification and review of technical risks starting at Milestone “A” would significantly ameliorate this problem.

Despite DoD policy that reflects a preference for evolutionary acquisition, the Service Chiefs frequently bring forward “requirements” for new weapons systems whose performance goals require technologies that are immature at best. In recent years several such programs have been approved for Milestone B initiation despite the fact that many of the critical technologies needed to achieve such capability were years away from adequate maturity, and mature alternatives were not available.

The GAO has estimated the effect of such departures from policy in an analysis of 54 major programs.<sup>6</sup> Only 15% of these programs began full systems development with mature technology:

- Programs that started with mature technologies averaged 9% total development cost growth and a 7-month schedule delay
- Programs that did not have mature technologies averaged 41% total development cost growth and a 13-month schedule delay

Again, while DoD has not confirmed the accuracy of GAO’s specific estimates, there is no doubt about the accuracy of the implications. The Army’s Future Combat System (FCS) is a well-known specific example. The 2004 IDA review of the Army’s FCS program noted a large number of technical issues that had not been resolved at the time approval was given to

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<sup>6</sup> Defense Acquisitions: Assessments of Selected Major Weapon Programs, GAO-05-301, March 2005.

proceed into system design and development. One result of these unresolved technical issues was the slippage of the Preliminary Design Review by at least 1 year and overall slippage of initial operational capability by 4 years. These changes obviously call into question the appropriateness of the Milestone B approval decision in 2003.

In addition to the late involvement of the Milestone Decision Authorities in the planning of key features of new programs, including technology, the ability of DoD to competently identify critical technologies, program funds to reduce their risk, and then assess their maturity at Milestone B is hobbled by the lack of *independent* technical expertise. For most systems today, the program manager's office itself identifies the technologies to be assessed. This has caused some critical technology elements to be overlooked. In other situations, the panel that estimates the technology readiness level has had strong ties to the program office, which is in turn strongly incentivized to keep the program on the "approved" schedule. This lack of independence frequently leads to overly optimistic assessments and erroneous predictions of future maturation.

## **D. RECOMMENDATIONS FOR IMPROVING SYSTEMS MANAGEMENT**

### **1. Recommended Actions to Strengthen the Department's Systems Engineering Management Practices**

In conjunction with the revitalized Analysis of Alternatives (AoA) process recommended in section 1, reinstitute Milestone Decision Authority (MDA) oversight of the Milestone A process so that a sound systems engineering management plan is put in place for each alternative that will be pursued into a formal risk reduction/demonstration/validation phase leading to a possible Milestone B formal initiation of a new acquisition program.

There should be a very high bar for waivers of an inadequate systems engineering plan at formal program initiation at Milestone B. OSD scrutiny of programs should be much more intense for the events leading up to program initiation. Program managers must be held more accountable for ensuring good systems engineering practices as discussed elsewhere in this report. Specifics from the programs systems engineering plan should be incorporated into the annual operating plan.

Industry must be better incentivized. Most importantly, appropriate suitability demonstrations should be made co-equal with other key systems performance requirements in the prime contracts.

## **2. Recommended Actions to Strengthen the TRA Process**

- Require that the formal identification of key technical risks be made at Milestone A, with specific funded plans to be put in place to achieve their specified level of technical maturity by Milestone B.
- Require that sound, independent TRAs be available to all levels of acquisition management well in advance of Milestone B.
- Raise the bar for waivers to existing TRA maturity levels such that only programs of great urgency and strategic importance, as agreed to by the MDA, are allowed to proceed into SDD without demonstrating the specified levels of technical maturity.
- Program and budget sufficient science and technology funding to conduct the necessary technology maturity demonstrations as identified in each program's baseline documentation.
- Strengthen the technical competence and independence from conflict of interest of the government teams that
  - Identify areas of technical risk, and
  - Formally assess the maturity of the associated technology developments.<sup>7</sup>

This would better assure both the Milestone Decision Authorities and the Congress at key decision points.

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<sup>7</sup> This could be done by adapting the operational test model to TRAs. One reason that operational testing is so successful is the independence and technical competence of the Department's operational test and evaluation staff.

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### III. IMPROVING ACCOUNTABILITY IN THE ACQUISITION WORKFORCE

In its simplest terms, the Packard Commission recommended that DoD implement an industry model with six attributes. A general assessment of the lack of full implementation of those recommendations was included as Appendix B in our Phase I Report, IDA Document D-3189. The following two attributes appear to the Team to warrant near-term Under Secretary attention to help improve accountability in the Department’s acquisition process.<sup>1</sup>

#### A. CLEAR COMMAND CHANNELS

Clear command channels are what Packard hoped to achieve by limiting intervening layers between the program manager (PM) and the Acquisition decision maker (Defense or Service Acquisition Executive—DAE or SAE) to no more than two. In Packard’s view, the shortened decision-making chain would alter the nature of oversight in a way that would reduce the number of staff overseers and speed up decision making.

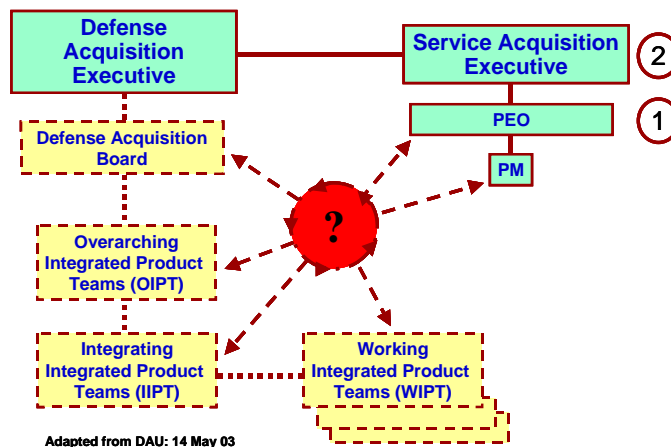


Figure IV-1. Comparison of Packard with Current System

<sup>1</sup> Accountability is the “Liability to give account of, and answer for, discharge of duties or conduct; responsibility” (Oxford Dictionary)

While DoD policy documents say the Department has implemented Packard, one has simply to overlay a graphic of the proposed Packard chain of command with the Integrated Product Team (IPT) structure currently *mandated* by DoDI 5000.2, to see the problem:

- First there is the Overarching IPT (OIPT).
- Next there is the *mandatory* Integrating IPT to coordinate the activities of *whatever* subordinate IPTs are deemed necessary by the OIPT.
- Finally, there are the subordinate IPTs called Working IPTs. These virtually always – and appropriately - include a Cost IPT and a T&E IPT

Clearly, short lines of communication have not been established and this failure is a matter of official policy. The OIPT is widely seen as a particular impediment to the rapid and effective decision making contemplated by Packard. By increasing the accountability of the subordinate acquisition executives, the need for this extra layer of virtual management could be reduced. However, because cost estimating and test planning span a broad range of responsibilities and the entire program time horizon, these two IPT activities should be continued.

## **B. CLEAR RESPONSIBILITY AND CONSEQUENCES FOR ACTIONS**

Packard stated that “authority for executing acquisition programs—and accountability for their results—has become vastly diluted.”

We conclude that not only has this problem not been fixed in the 19 years since Packard, it may have gotten worse in some ways despite implementation of Packard’s recommendation to establish a Defense Acquisition Executive.

The need for improved accountability is obvious in Packard’s recommendations on short decision chains and personal commitments for contracts between PMs and Acquisition executives.

Paul Beach, in his 1990 report on how the Navy’s A-12 stealth aircraft development program reached the point where it was canceled for cause,<sup>2</sup> itself a rare instance of accountability, described the issue perfectly:

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<sup>2</sup> The continuing litigation costs of this disputed cancellation have now reportedly exceeded the amount in dispute.

The fundamental problem ... is to create appropriate incentives to enable senior leaders to rely upon responsible, *accountable* line managers for realistic perspectives on the cost, schedule and technical status of their programs. Only by doing so can we increase efficiency and *accountability* while reducing the burdens imposed by undue regulation and stifling supervision.

Unless means can be found to solve this *abiding cultural problem*, the failures evidenced in this report can be anticipated to occur again in the same or similar form.<sup>3</sup>

Policies, goals, practices, and other forms of enterprise expectations, while they are necessary, will not by themselves instill or sustain a desired level of performance or behavior. Only the nature and likelihood of consequences—positive and negative—can do that, and too often consequence is missing from the DoD acquisition environment. The Department promulgates more and more policy directives to obtain the wanted behavior, but *the lack of consequences renders the directives ineffective*. When the workforce, including middle management, perceives there are limited, if any, consequences for following or not following policies, that lack of consequence tends to subordinate those policies to other more immediately consequential considerations. Such considerations can include expected rewards for avoiding taking management actions that would imply schedule slips, or that would trade minor performance goals favored by senior service executives against cost.

If accountability is to be improved, all levels and elements of the acquisition community need to know three things:

1. That they will be called to account
2. What they will be held accountable for
3. That there will be consequences for their actions—or inactions

One of this study's authors had a discussion with a Service Acquisition Executive (SAE) that went as follows:

In recurrent conversations with your PMs, I ask, "What does the SAE expect from you?" Invariably, the answer is "to bring my program in on time, within cost, and meeting performance goals." We all know the DAU answer, so the question is rephrased and personalized to, "What does SAE Smith expect from you, Captain Joe Jones, for your program, in its unique state of affairs which is different from the state of any other program?" The answer to that question is

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<sup>3</sup> Chester Paul Beach, Jr., "A-12 Administrative Inquiry," 28 November 1990.

usually a blank stare, *and that is the issue*. People cannot be held to account if they do not know specifically what is expected. The question is rephrased, “What does SAE Jones expect from you, Colonel/Captain/Mr. Joe Smith, on your program, in its current state of affairs which is different from the state of any other program?” The answer to that question is always a blank stare, *and that is a major issue*.

This disconnect between the formal acquisition reporting chain and true accountability exists largely because the Acquisition Executives are not the primary conduit for long- or short-term program funding. This is in direct contrast to industry practice where a program manager’s agreement with his leadership usually includes funding guarantees. Other Service and DoD offices with authority over program funding streams have a major impact on the DoD acquisition Program Manager’s ability to execute the “contract” he has established with the relevant Acquisition Executives.

The Annual Operating Plan concept (AOP) mitigates this persistent accountability problem. PMs justifiably say, “You can’t hold me accountable for things I don’t control, and the PPBE and appropriation processes are constantly changing my program.”

If the AOP is based on the fiscal year, most funding changes and impacts are known by the August/September time frame, which provides sufficient time to set the next year’s goals in a manner that is almost entirely under the control of the CAE, PEO, and PM.”

## **C. INITIATIVES FOR IMPROVED ACCOUNTABILITY**

### **1. An Annual Operating Plan**

DoD needs a fresh approach to acquisition accountability, based on the following DoD Business Management Modernization Program (BMMP) realignment principles:

1. DoD business enterprise clarity;
2. Tiered accountability, and
3. Program management discipline.

Such an accountable management system could best be based on a model that is centered on an *annual operating plan*. This would largely avoid the problem noted above in which non-acquisition officials have authority over longer term funding.

An annual operating plan (AOP) is a schedule of events and responsibilities that details the actions to be taken in order to accomplish the goals and objectives laid out in the *approved plan*. The AOP ensures everyone knows what needs to get done, coordinates efforts when getting it done, and keeps track of whether and how it got done.



In the current DoD acquisition environment, the Acquisition Program Baseline (APB) serves as the long-term plan. The trouble with the APB, and long-term plans in general, is that they commonly extend so far into the future that it is impractical to hold anyone accountable for their eventual achievement. For example, how can a Component Acquisition Executive (CAE), Program Executive Officer (PEO), or Program Manager (PM) be held accountable for achieving Initial Operating Capability (IOC) when it is 10 to 15 years or more in the future? Obviously they cannot. But, an AOP based on approved 1-year funding could establish and measure progress on those events in the next 12 months that are on or near the critical path to IOC. Progress over the upcoming year can easily be measured and appropriate persons can be held accountable for progress. Failure to achieve the annual goals would be an early indicator of a potential slip in IOC. If the AOP is based on the fiscal year, most funding changes and impacts are known by the August/September time frame—early enough to allow the next years’ goals to be set in a manner that is almost entirely under the control of the CAE, PEO, and PM.

The establishment of an Annual Operating Plan would more properly align responsibilities and authority within the Department’ acquisition process, and would permit CAEs, PEOs, and PMS to become more objectively accountable for the progress of their programs.

Additional detail on establishing and utilizing DoD Acquisition Annual Operating Plans is presented in Appendix B.

## **2. A More Flexible and Accountable Acquisition Workforce**

The AOP is only one aspect of the accountability issue. The AOP would enhance organizational clarity and establish the expectations upon which accountability can be based, but accountability requires at least two participants—the one being held accountable, and the one doing the accounting. The first is easily established, but finding leaders who will do the accounting is another matter. Instilling accountability and achieving “fundamental change in the department’s acquisition process” depends on leadership. The next step, then, is to take control of the acquisition workforce to nurture and reinforce an environment of accountability.

DoD needs an acquisition workforce that is well trained, broadly experienced, and mobile. The Defense Acquisition Workforce Improvement Act (DAWIA) establishes a reasonable starting point, but more improvements are needed. In particular, management must be able to unilaterally deploy personnel where their talents and backgrounds are

most needed. In addition, management needs to be actively engaged in career planning to ensure a deep pool of the best talent available. Actively engaged means people need to be told when they are falling short and when they need career broadening experience. Such management should adopt for the civilian acquisition workforce some of the characteristics of the Service's officer management programs. That does not have to mean an up-or-out policy, but it may mean an up-or-*stay put* policy. Movement into any Critical Acquisition Position (CAP), or promotion from one CAP to a more senior position, should require increasingly rigorous qualifications for breadth of experience and depth of training. Management should facilitate workforce mobility at the local, Service, and Agency level to enhance the preparation of those acquisition workforce members who demonstrate the desire and ability to be acquisition leaders.

On the other hand, if the current practice of rotating military program managers too frequently cannot be seriously ameliorated, serious consideration should be given to staffing most DoD program offices with civilian Program Managers who will be expected to stay in place until the program succeeds (or is canceled)<sup>4</sup>. Military officers could bring their valuable battlefield experience to bear as rotating deputy program managers.

Succession planning should be established for ACAT I and II PMs, PEOs, and higher-level CAPs, to mitigate the adverse impact of routine management rotations and other changes. Properly done, this will enable replacement by people who understand the nature of both their programs and the policy initiatives of the current senior leadership.

Other enablers of a high-quality workforce include:

- Strict limitations on the amount of non-acquisition experience (e.g., “command” time) permitted for qualification.
- Elimination of the grace period that allows individuals up to 18 months to get qualified in a position to which they are already assigned—no more OJT that lasts for up to half the PM's tenure.
- Require all PM and higher level CAPs to be filled with persons Level III certified in at least one DAWIA specialty other than that required for the particular CAP.
- Require and enforce mobility agreements for all civilian CAPs.

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<sup>4</sup> Most Naval officers that led the development of the Navy Tactical Data System (NTDS) development were with that successful project for at least six years – more than twice the current practice. *When Computers went to Sea*; David L Boslaugh, 1999.

- Require senior-level CAPs to have experience with multiple acquisition organizations with cross-Service and Agency experience preferred.

#### **D. RECOMMENDATIONS FOR IMPROVING ACCOUNTABILITY IN THE ACQUISITION WORKFORCE**

##### *1. The Under Secretary of Defense (AT&L) should establish a new oversight process that utilizes tiered accountability.*

- An Annual Operating Plan with goals and objectives should supplement the APB as the primary agreement for the next 12 months for which each level of management will be held accountable.
- Quarterly reviews should be restructured.
  - Hold on-site reviews in the facilities of each host Component (as a practical matter, non-Service Components could be at a mutually acceptable location).
  - Hosting Component sets the agenda based on the progress against the AOP (this should not preclude the USD(AT&L) from specifying a limited number of special interest items).
- The annual operating plan should be structured and implemented in a manner similar to a balanced scorecard.<sup>5</sup>

##### *2. The Under Secretary of Defense (AT&L) should cut back on the size and function of the OIPT structure.*

- The Component Acquisition Executives should be held responsible and accountable for their programs. They should determine when their programs are ready for a milestone review within the guidelines of DoD acquisition policy (including the systems engineering guidelines discussed in the Section II of this report) and they should have the authority to schedule such reviews with the Defense Acquisition Executive when they believe they are ready.
- DAE staff should be responsible for, and given enough lead time and information by the CAE) for preparing the DAE for the review but not for deciding when and whether to hold a review. Accountability requires the review to be held when the responsible CAE claims readiness. If it turns out the program is not ready, the CAE is sent back with an admonition not to call reviews for which they are not prepared.

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<sup>5</sup> For a detailed description, see Gary E. Christle et al., “Improving Acquisition Metrics, Phase II,” Center for Naval Analyses, October 2002.

3. *The Under Secretary of Defense (AT&L) should use the flexibility inherent in the new National Security Personnel System to exercise aggressive leadership in career management, creating a truly professional acquisition corps that is well and broadly trained, and easily deployed on an individual basis to where the skills are needed.*
- Strictly enforce qualification requirements for PM selection.
  - Require all PM and higher level CAPs to be filled with persons Level III certified in at least one DAWIA specialty other than that required for the particular CAP.
  - Implement succession planning for PM and higher CAPs.
  - Ensure the final version of the National Security Personnel System (NSPS) will support the above actions.

## **IV. INDUSTRIAL BASE AND ACCESS TO TECHNOLOGY ISSUES**

As noted in the Phase I report, the Team examined several acquisition reform initiatives that are related to industrial base and access to technology issues. We found that, although many such specific issues rise to the attention of the Under Secretary in the normal course of the Department's activities, there are no management issues in this sector that are sufficiently urgent to warrant a major new USD(AT&L) initiative. The following material summarizes our evaluation. The first topic identifies a potentially useful minor initiative.

### **A. CHALLENGES TO DOD ACCESS TO TECHNOLOGY**

The day has long passed when the Defense Department could rely exclusively, or even primarily, on technology that had been developed as a result of DoD investments. The explosion of new applied technology in the US commercial sector, coincident with globalization of such developments, poses a significant challenge to DoD. No longer can government laboratories and traditional defense contractors be looked to as the primary source of new technologies important to future defense systems. Indeed, acknowledgement of this trend lies behind many of the acquisition "reforms" adopted by the Department over the past decade, including its enthusiasm for the use of Other Transaction Authority (OTA) agreements to hopefully gain greater access to non-traditional suppliers.

But applied military technology flows out of basic research, which in this country, with the exception of drugs, is still largely dependent on federal funding. The problem for DoD is being exacerbated both by the ongoing decline in the federal investment in basic and applied research, and by the Defense Department's decision in the 1990s to cease giving industry incentives to spend its government-reimbursed independent research and development funding on long-term science and technology projects that are of particular importance to national defense needs.

## **B. BROAD-BASED SOLUTIONS FOR IMPROVING DOD ACCESS TO TECHNOLOGY**

The simple solutions to the aforementioned challenges would be to—

1. Reverse the decline of federal spending on basic research by increasing DoD and other federal agency investments in this area.
2. Resume the former DoD practice of “scoring” industry independent research and development (IR&D) projects against the Department’s long-term goals when determining the level at which such investments would be reimbursed via DoD contract overhead allowances. Such an action is well within the purview of the USD(AT&L) and is included here as a potential new initiative worth pursuing.

The National Academy’s *Committee on Prospering in the Global Economy of the 21<sup>st</sup> Century* recently produced a study for the Senate Energy and Natural Resources Committee. This study emphasized that the federal government is the *only* source for funding basic research in the United States; that corporate R&D funding is product-oriented; and that many of today’s most successful commercial technologies originated in basic research funded by the Department of Defense, where support for such funding continues to wane. The study recommended that DoD funding of basic research be increased at a rate of 10% per year. Such a funding increase would also benefit efforts to increase the availability of the meaningful, interesting, and important research work needed to further motivate US students to pursue challenging technical and scientific education goals.

The more complex issue involves DoD access to advanced technologies whose centers of excellence are outside the United States. To date, DoD has relied primarily on its large, multinational prime contractors to manage such access, and this may continue to be the best approach. We are making no specific recommendations for a new initiative in this area, which the Team does believe warrants increased attention.

## **C. INDUSTRIAL BASE ISSUES**

Just as the American public broadly benefits from the growing globalization of the consumer economy, within limits the Defense Department also broadly benefits from the globalization of the supply chain both for the lowered cost of its commercial product needs and for its access to advanced technologies for which the US is not a leader. But

for supplies for which a surge capacity is assessed as an important element of US national security planning, there is no reason to depart from the current practice of funding such standby capacity in the US. Such needs include, for example, vaccine production, antidote production, other limited shelf-life supplies, and some types of ammunition.

It is also important that the equipment on which the United States relies for its most sensitive communications and intelligence activities are assembled from “trusted sources” of components. This area was also the subject of a recent report by the National Academy,<sup>1</sup> which recommended that DoD maintain its current “in-house” abilities to produce trusted printed circuit boards, while taking specific steps to assure such secure capabilities for the future.

There are obviously other strong incentives for the United States to ensure that its industrial base can continue to produce the principal weapons systems that are used to equip its military forces. However, as DoD becomes increasingly dependent on technology for which other free world countries may have gained a competitive advantage, it is unrealistic—even counterproductive—to demand that arbitrary percentages of DoD equipment components and software originate in the United States. Furthermore, paying for the maintenance of excess defense industrial production capacity in the hopes of reducing costs through competition is also generally counterproductive, as discussed below.

Paying for extra capability to design and prototype new, innovative forms of military equipment may well be worthwhile, but, as also discussed below, such a program would need to be made profitable in its own right to be successful.

## **D. COMPETITION**

There are two chief perceived benefits of formal competition in defense acquisition programs: design innovation and cost reduction.

### **1. Design Innovation**

Competition is very effective in bringing forth the best industry can offer at the beginning of every major new acquisition program. Top talent is frequently switched

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<sup>1</sup> Linkages: Manufacturing Trends in Electronics Interconnection Technology, National Academy Press, 2005.

from lucrative ongoing programs to help formulate the company's technical concepts for the big competition at hand. And the reason for this success is not hard to discern; the companies know that the winner probably will never have to face further real competition on that program. For this reason, bidders not only commit their best design talent, but also frequently promise to share the cost of the early development phase of the program. Some may still believe this is a good deal for the government; *the team does not*. By accepting such in-kind "contributions" early in development, the government sub-optimizes its long-term interests and makes some implicit commitment that it will proceed into full-scale development and production. Such a commitment, whether implicit or not, limits the government's ability to decide on alternate courses of action.

Furthermore, if the government places any significant weight on such "up-front" contributions when selecting the prime contractor, it may well forgo much larger benefits available from other bidders in terms of lower future production and operating cost and/or better system performance features. Such considerations have motivated the Department's growing use of "best value" source selection criteria in recent years.

At least the early phases of research and development (R&D) activities should be made profitable in their own right, without the promise of a production run to "get well." Such an approach could greatly increase the government's ability to keep competent design teams productively employed without the obligation to take designs to production before they may be needed. It might also bring into the DoD orbit many nontraditional R&D firms that may be able to contribute innovative ideas. But this would be a hard sell, in part because of the very real intellectual property ownership issues that surround such programs. As discussed earlier in this report, the pre-milestone B risk-reduction process could be strengthened by adequate and profitable funding of technology demonstration and validation of alternative technologies prior to formal decisions on the structuring of a major program.

There are also always ongoing pressures to only invest significantly in developments for which there is a follow-on production program. The Joint Strike Fighter program started as a series of design and prototype testing competitions for advanced aircraft components and subsystems, but industry, and perhaps the Congress, quickly insisted that such expenditures would be justified only if an aircraft development program was established in the funded program of record. It will take sustained senior leadership to ensure that risk-reduction hedges do not gain enough political momentum to become unwarranted duplicative acquisition programs.



## **2. Cost Reduction**

In contrast to the benefits of formal design competition, the cost reduction benefits of competition are often overestimated, at least at the major system level. Indeed once a major defense contractor has won a design competition for a complex major system such as a new combat aircraft, or class of ship, and any subsequent down-select that is intended to lead to production, the threat of further competition will have largely vanished. At that point the contractor's duty to his shareholders to keep costs and profits up on the prevalent cost-type contracts begins to conflict directly with the government's interest in driving costs down. The only exception is the currently infrequent situation in which the production rates are expected to be high enough that the cost of funding a second source would likely be more than offset by the savings from competitive pressure.

Once a qualified prime contractor is producing satisfactory equipment under a prime contract, the government usually needs to employ tools other than direct re-competition to encourage cost limitations and reductions. These tools take many forms, such as detailed tracking of the contractor's actual costs, directed component break out, and award and incentive fees, and are highly unique to government management practices. The private sector has very few, if any, long-term cost-plus contractual relationships where the buyer has no alternate supplier reasonably available.

## **3. Other Types of Competition**

There is a third potential use of competition in defense acquisition that has not been generally adopted but may be worth additional attention. This is the notion of cross-system and even cross-Service competition for funding to meet a real "mission" or "capability" need. Such an approach has been suggested by past Defense Science Board task forces through such broad examples as comparing the costs of striking inland targets from Navy carriers with the costs of Air Force bombers for the same effects. The Department is not currently organized or staffed to routinely conduct such studies of broad alternatives "in house." Having conducted a Deep Attack Weapons Study along these lines for OSD several years ago, IDA can attest to the difficulties of such attempts at explicit cross-service competition.

The Department at one time championed a "Challenge" program in which outside suppliers could formally offer to provide some piece of equipment, or subsystem, to DoD at a lower price than was currently on contract. The opportunities for benefiting from such a program have probably declined in recent years as the Department has undertaken

less and less of its own system integration work, thereby reducing its ability to switch sources for components or subsystems. Nevertheless, some such new effort to open ongoing DoD contracts to new ideas and technologies from outside suppliers may well be warranted.

## **Appendix A**

### **ANALYTIC TEAM**

#### **CO-CHAIRS**

**David J. Berteau.** Senior consultant, IDA; Director, Clark and Weinstock, Washington, DC, and Adjunct Professor, National Security Studies, Syracuse University. Previously: Senior Vice President, SAIC; Principal DASD (Production & Logistics, OSD); DASD (Resource Management & Support, OSD); Executive Secretary, Packard Commission.

**Gene Porter.** Member of the Adjunct Staff, IDA; Previously: CNA Scientific Analyst to the ASN(RDA); Deputy Executive Director, Commission on Roles and Missions of the Armed Forces; Director, Acquisition Policy and Program Integration, OUSD (A&T); Product Line Director, Sanders, a Lockheed Martin Company; Principal DASD (Systems Analysis) (OSD).

#### **OTHER MEMBERS**

**Gary Christle.** Mr. Christle retired from Federal Service in October 2000 as the Deputy for Acquisition Management, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) and is currently with the Center for Naval Analyses. In his prior position, he was responsible for Department of Defense (DoD) Acquisition policy as embodied in the DoD 5000 series documents. This responsibility included the role of Defense Acquisition Board (DAB) Executive secretary, establishment of Acquisition Program Baselines (APB), and supervision of the monthly Defense Acquisition Executive Summary (DAES) process for monitoring the cost, schedule and technical status of major acquisition programs. He was also responsible for policies regarding contractors' internal cost and schedule control systems (Earned Value Management Systems (EVMS)) and was a member of the DoD Cost Analysis Improvement Group.

**Jay Mandelbaum.** Research Staff Member, IDA; R-TOC Program Manager, Defense Systems-Systems Engineering OUSD(AT&L); Executive Secretary, Defense

Systems Affordability Council, Acquisition Reform Office, OUSD(AT&L); Deputy Director, Commercial Programs, International and Commercial Programs, OUSD(AT&L); Deputy Director, Munitions and Sustainability, Logistics, OUSD(AT&L).

**Richard Diehl.** Adjunct Staff Member, IDA; Previously: President, Diehl & Sobczak, P.C., specialist in Federal Procurement law (represented numerous exchange-traded and smaller enterprises in materiel acquisition issues, including litigation before a variety of administrative and judicial venues); twice managed multibillion dollar Army procurement programs—the Bradley Fighting Vehicle System and Medium Tactical Vehicles.

## Appendix B

### THE ANNUAL OPERATING PLAN CONCEPT

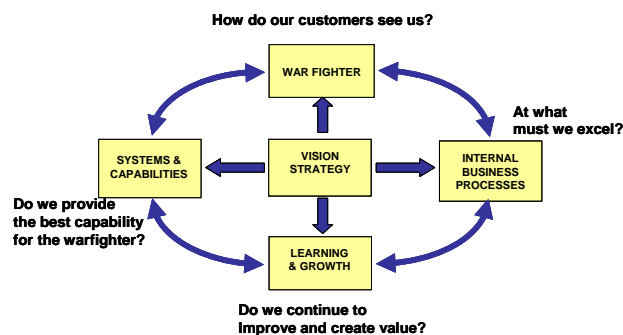
Implementing an annual operating plan (AOP) requires that goals and objectives be set and regularly monitored. Most companies do this with something that resembles a Balanced Scorecard (BSC).

The generic BSC integrates an organization's vision and strategy and typically has four elements: Financial, Processes, Customers, and People.

In turn, each element has objectives, measures, targets, and initiatives.

In a commercial enterprise, "Financial" is usually the most important element because enhancing shareholder value is usually the enterprise's reason for existence. The other three elements are the means by which the financial objectives are achieved, and the purpose of the BSC is to ensure the other elements are not sub-optimized.

For the DoD acquisition enterprise, the BSC should be adopted to reflect the reason for "Acquisition," i.e., the delivery of systems and capabilities to the warfighter customer. Financial metrics are usually important to DoD, but they are measures that should be incorporated under each element as appropriate. Figure B-1 shows one way to adapt the traditional BSC to DoD Acquisition.

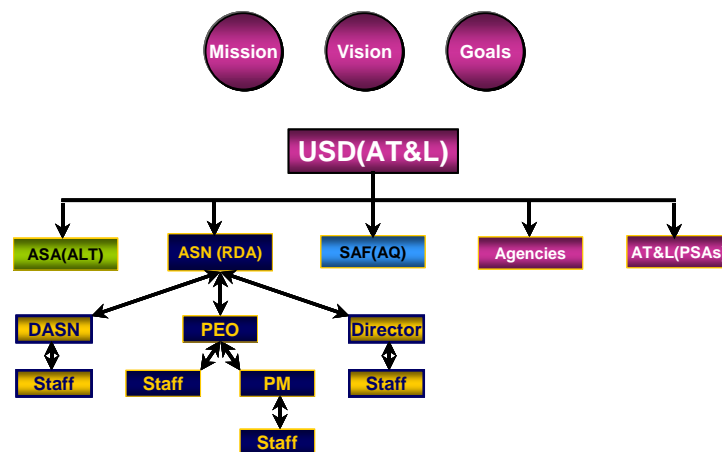


**Figure B-1. DoD Acquisition Balanced Scorecard**

The BSC is the framework within which the goals and objectives of the AOP should be established, along with metrics to measure progress throughout the year.

Secretary Krieg has raised a concern with metrics, as follows: “We measure everything, but by measuring everything and aligning nothing at senior levels, we really measure nothing.”<sup>1</sup> The AOP/BSC addresses this concern by establishing a means to continually measure progress towards a limited number of goals and objectives that are tailored to each Component Acquisition Executive (CAE), Program Executive Officer (PEO), and Program Manager (PM).

Figure B-2 shows one way to flow down the AOP/BSC. Note that the flow goes down to the staff level as well as to the *AT&L Principal Staff Assistants*. In this way all participants, at all levels, have a stake in achieving common outcomes. At appropriate levels this flow of the AOP/BSC supports the new National Security Personnel System performance requirements for civilians and should similarly support uniformed fitness reports as well.



**Figure B-2. Balanced Scorecard Flow Diagram**

The AOP/BSC should be combined with a new oversight process that replaces the current Defense Acquisition Executive Summary (DAES) process, wherein CAEs are called to respond to an agenda largely established by the AT&L staff, with a process that recognizes who is responsible and accountable for execution, and reflects how those responsibilities are tiered. The review agendas should be generally set by the host CAE and should be focused primarily on execution of the AOP. This focus should include an

<sup>1</sup> Address to DAU faculty and students on transforming the processes and decision tools in the Department of Defense (DoD), as reported in Defense AT&L, January–February 2004.

aggregate portfolio view with individual programs addressed on an exception basis. In the private sector, the AOP/BSC is usually combined with quarterly *on-site* reviews of business unit portfolios, supplemented by monthly reporting, usually of financials. Earned value reporting could be a useful surrogate for the industry financial reporting process. The data is produced by the contractor in the routine execution of significant contracts, is an objective measure of progress, and imposes virtually no reporting burden on the PMO.

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